



Tawny Coster
(*Peraea terpsicore*) female
(top) and male on
Kybanthus enneaspermus

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AIMS OF ORGANIZATION

- To establish a network of people growing butterfly host plants;
- To hold information meetings about invertebrates;
- To organize excursions around the theme of invertebrates e.g. butterflies, native bees, ants, dragonflies, beetles, freshwater habitats, and others;
- To promote the conservation of the invertebrate habitat;
- To promote the keeping of invertebrates as alternative pets;
- To promote research into invertebrates;
- To encourage the construction of invertebrate friendly habitats in urban areas.

MAGAZINE DEADLINES

If you want to submit an item for publication the following deadlines apply:

March issue – February 1st

June issue – May 1st

September issue – August 1st

December issue – November 1st

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COVER PAINTING

Acraea terpsicore (Tawny Coster) on *Hybanthus enneaspermus* – painting by Lois Hughes. Prints available on request.



FROM THE PRESIDENT

Little did I realise the learning that was to come from Geordie Paton's discovery of an "Orange Glasswing" near Kununurra last April. I am sure that you will enjoy the story that follows. Lois has certainly excelled in the painting of a beautiful cover to go with our article. I have not paid much attention to our Australian Glasswing (*Acraea andromacha*) in the past. It is a hardy, unspectacular and often barely noticed resident. Peter Hendry's research and report on the *Acraea* genus worldwide has opened my eyes to a quite spectacular group.

I thank all the contributors of the various articles, which together provide a great deal of new information in this edition of our magazine. Once again Daphne has woven all the threads into a colourful tapestry.

I am sure that this edition takes us to a record number of destinations. Kelyvn Dunn leads us on a tour to dozens of locations across every Australian State as he reports on observations of the Orchard Swallowtail and Cabbage White butterflies. Alan Hyman writes of his much loved Bundanoon area in NSW. Peter Hendry writes of the moth *Oxycanus beltista* found at Mt Tambourine Qld, while Graham MacDonald tells of *Grammodes justa* found nearby in the Gold Coast hinterland. Then Peter leads us on a tour of Africa to visit various *Acraea* homelands with a brief sojourn in Papua. The Tawny Coster leads us from India and Sri Lanka across South-east Asia to northwest Australia. Ray Archer and Mike Barnett give us another glimpse of Africa. The Tube Spittlebug rates a mention in Indonesia, West Papua and Australia. Wes Jenkinson writes in his usual detailed style of the Caper Gull in Southeast Queensland. We touch down with Geordie Paton for a glimpse of Broome while Alicia takes us back to Mt Cotton and those water bugs but also manages to get in a mention of London!

Quite a journey!

Best wishes

Ross

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A new immigrant butterfly for Australia: *Acraea terpsicore* (Linnaeus 1758) – Ross Kendall

On the afternoon of April 27th 2013 I received a phone call from Club member Geordie Paton. Using his mobile phone he was calling from “the bush” near Kununurra in the East Kimberley of far northern Western Australia. Geordie said that he had just found a good number of orange coloured butterflies that looked like Glasswings (*Acraea andromacha*) but that the colour was wrong. He photographed a specimen using his phone and an emailed image arrived on my computer while we were still talking. It certainly was different!!!



Tawny Coster female
Photo Geordie Paton

The next day Geordie informed me that, through the Internet, he had discovered that the butterflies were Tawny Costers (*Acraea terpsicore*) usually found in India and Sri Lanka but first reported in Australia from near Darwin NT in April 2012 (Sanderson *et al.* 2012; Braby 2013). He contacted Michael Braby (in Darwin) who confirmed the identification and referred Geordie to two articles about the discovery of the butterfly published in the August 2012 edition of *Myrmecia* and the February 2013 edition of *Nature Territory*.

The authors confirmed that the butterflies were at several sites on the Cox Peninsula west of Darwin and it had also been found 90 km southeast near Adelaide River. At these sites larvae were found feeding on native *Hybanthus enneaspermus* (L.) F.Muell (Violaceae) a known host of *A. andromacha*.

A year later, Geordie found the butterflies 450 km southwest of Darwin near Kununurra.

Descriptions of the larvae and pupae of the Tawny Coster show that they are similar to those of the Glasswing. The average wingspan of the adult specimens examined was 50mm.

The upperside ground colour is bright reddish-orange in males and orange-brown in females, with a series of black spots. The pattern is similar on the underside, but with more pronounced cream subterminal spots on the hind wing.



Tawny Coster pupa
Photo Geordie Paton

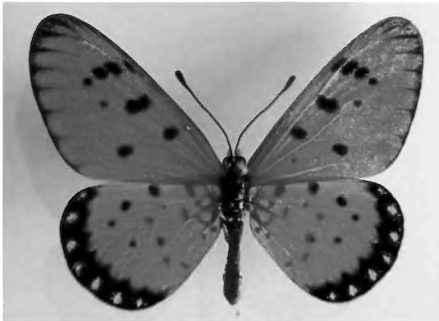




Male upperside



Male underside



Female upperside



Female underside

Photos Ross Kendall

Braby *et al.* (2013) report on the range expansion of this butterfly over the last 28 years and its successful colonisation of South-east Asia and Australia. Initially from India and Sri Lanka, it was reported from Thailand in 1984 and then progressively moved to Hainan via Laos and Vietnam and to Timor via the Malay Peninsular and the Indonesian islands of Sumatra, Java, Lombok, Flores and Sumba, moving at a rate of approximately 200km per year. Furthermore, Trevor Lambkin (pers. comm.), who regularly visits Flores Indonesia, reports that he collected *A. terpsicore* on Flores the first time he visited the island in October 2010. In addition he observed females ovipositing on a *Passiflora* sp..

The success of its spread, according to Braby *et al.* (2013), may be due to the fact that large areas of tropical forest have been cleared through the region thus allowing suitable invasive host plants to thrive. Lambkin (pers. comm.) reports this to be the case in Flores where much of the virgin deciduous monsoon forest in the far west of the island has been cleared and has allowed large areas to be inundated by weed species, the predominant one being *Leucaena leucocephala* (Lam.) Fabaceae.

The Monarch (*Danaus plexippus*) arrived here in the early 1870's followed by the Cabbage White (*Pieris rapae*) in the 1930's. It would seem that the Tawny Coster



(*A. terpsicore*) is permanently established in northern Australia. So, since European settlement, this species is the third successful immigrant butterfly to have established in Australia.

Acknowledgements

Geordie Paton for his enthusiastic fieldwork
Dr Michael Braby for information and advice

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ITEMS OF INTEREST

Life history notes on the noctuid moth *Grammodes justa* (Walker, 1858). Lepidoptera: Noctuidae: Catocalinae - Graham McDonald

Introduction: Moths of the genus *Grammodes* are often characterised by two distinct cream or yellow parallel lines on the forewing, which usually has a dark brown background. In the *Grammodes* “Group A” complex of six species (Hendry, 2011), the lines traverse the wing from the costa to the dorsum. In the “Group B” complex of five species, the cream lines do not reach the costa and there are other minor differences. Some species in Group A, such as *G. oculata*, *G. oculicola* and *G. ocellata*, have an ocellus (eyespot) on the tornus of the forewing. *G. justa* does not have this.

Distribution: *Grammodes justa* is found on the east coast of Australia from Cape York to the Sydney - Blue Mountains area and inland to the New England Tableland. It also occurs in the Northern Territory.

There are eleven (11) named *Grammodes* species in Australia as well as one undescribed species. The genus also has a wider distribution in the Ethiopian and Oriental regions (Common, 1990). Further information on the genus *Grammodes* is presented in a monograph by Peter Hendry in issue 62 of *Metamorphosis Australia*.



Host Plants: *Grammodes justa* larvae feed on the leaves of *Sauropus albiflorus* (formerly *Phyllanthus albiflorus*) in the plant family Phyllanthaceae. This plant is also known as “Showy Sauropus” (Fig. 1). *S. albiflorus* occurs from Cape York to S. E. Queensland, often growing as a rheophyte near water courses in rainforest. It also occurs in dry rainforests. The shrub grows to about one (1) metre tall and it has a twiggy appearance. It bears white to pink flowers to 5 mm, followed by 8 mm pumpkin-shaped fruit most of the year. S. E. Queensland has 10 species of *Phyllanthus* and two (2) species of *Sauropus*, some of which may also be utilised by *G. justa*. North Queensland has a far richer flora of *Phyllanthus* and *Sauropus* species.



Fig. 1 *Sauropus albiflorus*

Two closely related moths *Bastilla solomonensis* and *Buzara latizona* also feed on other Phyllanthaceae genera. *B. solomonensis* feeds on *Breynia oblongifolia* (Breynia) and *B. latizona* is known to use *Phyllanthus* spp.

Life History: The larvae of *G. justa* (Figs 2 & 3), rest on the stems of the host plant *S. albiflorus* during the daytime.

They are well camouflaged because they sit motionless in a longitudinal position on the pale stems which match their pale striated appearance. They feed at night and can often reduce a plant to a leafless skeleton. Plants usually recover.



Figs 2 & 3 Larvae



Fig. 4 Pupa and cocoon



One of the larvae pupated on 5 January, 2013, after growing to a length of 35 mm. The pupa was located in the substrate (in this case sand), inside a cocoon constructed of sand grains held together loosely by silken strands. Presumably larvae in other situations would use pieces of leaves, twigs and small stones in the substrate, to construct their chamber (Fig. 4).



The adult moth emerged on 5 February 2013 - pupal duration of around 30 days. The adult (Fig. 5) has a wing span of 38 - 40 mm and is active in the summer months.

Note: No ovipositing was recorded.

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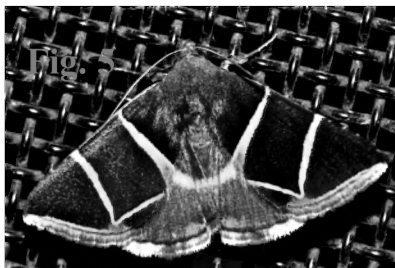
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Photos Graham McDonald



New Distribution Records for Swallowtail Butterflies (Lepidoptera: Papilionidae) in Eastern Australia - *Kelvyn L. Dunn*

E-mail: kelvyn_dunn@yahoo.com

Summary

This paper documents 29 new locations in eastern Australia for eight Swallowtail butterflies (namely, *Graphium sarpedon*, *G. eurypylus*, *G. macfarlanei*, *G. agamemnon*, *Papilio anactus*, *P. aegeus*, *P. ambrax*, and *Cressida cressida*), each record of which falls outside the boundaries of the species' distributions as indicated on the synoptic, range-filled maps provided by Braby (2000).

Introduction

Many keen insect enthusiasts who occasionally visit remote areas of Australia may think they need pay little attention to the Swallowtail butterflies these days, whose members are usually conspicuous on the wing and readily identified. Casual naturalists would likely photograph them often (and do), and regular observations have been forthcoming into databases from regions popularly visited by holidaymakers over the years. Although these larger insects can take up a lot of storage space in those expensive cabinets, the available statistics on historic holdings suggest that the collector's angle supports a good knowledge from take. As the facts stand, butterflies belonging to families that are characterised by conspicuous, large and colourful species (namely, the Papilionidae, Pieridae and Nymphalidae) are likely to find their way into a cabinet a little more often than not (Dunn 2010).

As with many showy members from other butterfly families, the main distributions of Swallowtails coincide with areas where extensive observations have taken place over



the many decades of collector activity – it is mostly the case, that the coastal or near coastal regions and the continent’s eastern shore board have been fairly well studied (Dunn & Dunn 2006, Dunn 2009). Yet, in spite of so much attention, the known distributions that Braby (2000) presented for some of the more widespread and common species in these groups are still patchy, fragmentary, and likely under-representative, particularly for those that regularly or seasonally disperse into the inland. During two lengthy field trips in inland New South Wales and outback Queensland (see Dunn 2013a for a map of sites visited), I routinely recorded Swallowtails (and all other butterflies) in order to help alleviate the knowledge imbalances that have been exposed of late (Dunn 2009, 2010); and I would encourage others to do likewise, if that interests them. An explorative approach has helped determine the extent of their occurrence in the inland and the extent of their continuity in some coastal areas where knowledge gaps in distributions have become evident; the many new locations for those species tabled provide ongoing evidence of that.

Methods

I identified most of the 30 swallowtail records listed (from the 29 new locations – one site was visited twice) without the requirement of handling; those twenty-seven (27) encounters (90%) recorded by ‘observation-only’ are marked (Obs.) to distinguish them from those that were photographed (Photo), captured and released (Rel.) and those that were retained as vouchers (KLD). For most observations (93%) the identifications were certain (Category 1) – in each case, I had seen sufficient characters to achieve that level of confidence. Two observations were to a level of almost certain (Category 2) as field circumstances sometimes did not permit sufficient time or closeness to identify the species to a level beyond reasonable doubt; these lower grade records are marked ‘C2’ (see Dunn 2011a for discussion of these and other categories of record acceptability). The means used to measure distances and define locations to precision of within a kilometre of the actual site, was described in a previous report (Dunn 2013b); extended discussion and other recommendations are available in Dunn (2013c).

Results and Discussion

Table 1 lists 29 new locations across four states in eastern Australia, arranged from north to south, where I found butterflies of this group; all sites fall outside the boundaries defined by Braby (2000) for the species concerned. One or more older records overlooked by Braby (2000) are reiterated and references to findings of other workers in the last decade or so are given, where their published new locations fall close to those found by me (and where my records become supportive). For *Papilio anactus* and *P. aegeus* the findings suggest that these two widespread species extend much farther inland in Queensland than was generally supposed; for the other species many of the extensions are minor, but still provide evidence of a broader occurrence than was known.



Table 1. Twenty-nine locations for species of Papilionidae from beyond their known ranges in Australia

Species/Location	State	Geocode	Date	Format
<i>Graphium sarpedon</i>				
Myrtle Creek, 3km NNE of Proserpine	Qld	20°23'S, 148°36'E	03 Nov 2012	Obs
<i>G. eurypylus</i>				
Little Laura River, 12km WNW of Laura	Qld	15°32'S, 144°21'E	11 Jan 2001	Obs
<i>G. macfarlanei</i>				
Pax Piel Bridge, at Myall Creek, 55km ESE of Weipa	Qld	12°39'S, 142°16'E	07 Jan 2002	Obs
Coen River, 3km N of Coen	Qld	13°55'S, 143°11'E	08 Jan 2002	Obs (C2)
Mt White, Coen	Qld	13°58'S, 143°11'E	06 Jan 2002	Obs
<i>G. agamemnon</i>				
Pax Piel Bridge, at Myall Creek, 55km ESE of Weipa	Qld	12°39'S, 142°16'E	07 Jan 2002	Obs
Little Laura River, 12km WNW of Laura	Qld	15°32'S, 144°21'E	09 Jan 2002	Obs
<i>Papilio anactus</i>				
Chillagoe	Qld	17°09'S, 144°31'E	12 Jan 2002	Obs
1km E of Cloncurry, at van park	Qld	20°42'S, 140°31'E	22 Oct 2012	Voucher
Boot Hill Creek 62km SW by S of Sarina	Qld	21°50'S, 148°56'E	04 Nov 2012	Obs
16km NE by N of St George	Qld	27°57'S, 148°42'E	16 Nov 2011	Obs ^{Note 1}
Neagles Lookout, Clare	SA	33°50'S, 138°38'E	26 Oct 2007	Obs
Bega	NSW	36°41'S, 149°51'E	02 Mar 2008	Obs
<i>P. aegeus</i>				
Bottle Tree Lookout, 58km NE of Hughenden	Qld	20°28'S, 144°24'E	28 Oct 2011	Photo (see Figs 1-3)
Torrens Creek	Qld	20°46'S, 145°01'E	28 Oct 2012	Obs ^{Note 2}
24km NW (by rd) of Tambo	Qld	24°45'S, 146°06'E	26 Oct 2011	Obs
Tambo	Qld	24°53'S, 146°15'E	25 Oct 2011	Obs
			26 Oct 2011	Obs
Warrego River, 42km NNE of Charleville	Qld	26°05'S, 146°25'E	25 Oct 2011	Obs
41km NNE of Charleville	Qld	26°06'S, 146°25'E	01 Oct 2012	Obs
28km NNE of Charleville	Qld	26°12'S, 146°21'E	01 Oct 2012	Obs
Charleville nr showgrounds	Qld	26°24'S, 146°15'E	25 Oct 2011	Rel
11km S by W of Charleville	Qld	26°29'S, 146°13'E	25 Oct 2011	Obs
16km NE by N of St George	Qld	27°57'S, 148°42'E	16 Nov 2011	Obs ^{Note 3}
3km E of Cunnamulla	Qld	28°04'S, 145°43'E	27 Sep 2012	Obs
1km S of Cunnamulla	Qld	28°05'S, 145°41'E	27 Sep 2012	Obs
Moonlight Creek picnic ground, Mt Worth State Park	Vic	38°17'S, 146°01'E	27 Jan 2011	Obs ^{Note 4}



Species/Location	State	Geocode	Date	Format
<i>P. ambrax</i> 2km NW of Isabella Falls	Qld	15°17'S, 145°00'E	10 Jan 2001	Obs (C2) Note 5
<i>Cressida cressida</i> Pentland	Qld	20°32'S, 145°24'E	05 Nov 2011	Obs
Burra Range Lookout	Qld	20°43'S, 145°13'E	13 Feb 1994	Obs Note 6

Key:

Note 1. Valentine & Johnson (2000: 60) broadly recorded *P. anactus* as present “between St George and Cunnamulla.” It is implicit in that statement that the butterfly was present at both end-point towns and that they had seen the species at a number of other places, so circumscribed, as their evidence of a more or less continuous range across that part of inland southern Queensland. My record from near St George is just beyond the distribution provided by Braby (2000) and is adjunctive to the updated and enlarged distribution given by Valentine & Johnson (2000) from their own encounter data set.

Note 2. Atkins *et al.* (2003) had earlier recorded *P. aegeus* in the White Mountains National Park, a region located to the north of Torrens Creek township that is also outside the range given by Braby (2000).

Note 3. Dr John Moss, who kindly reviewed this paper prior to publication, has advised that he had photographed *P. aegeus* along the Balonne River at St George on 28 Sep. 2010 and, on the following day, saw others farther west along the Balonne Highway at Thrushton National Park, just NE of Bollon. Edwards (1948) recorded the species at Mitchell (to the north-northwest of St George), which is on the boundary of the contemporary distribution in that region. As the new records are very recent (2010 & 2011) and are coincident with unusually wet seasons, one might suppose a novel range expansion has occurred. However, the butterfly’s continuity into the St George area of the Warrego region would seem unexceptional (given historic knowledge from Mitchell); earlier workers have probably overlooked the butterfly’s presence there.

Note 4. Dunn (2011b) reported that 37 encounter records of *P. aegeus* were made in Victoria during the unusually wet season of 2010-11, a time that saw additional species of butterfly enter that state. The Mt Worth encounter (at about 295m asl) provides the southernmost record from Victoria, and was the only one of those 37 compiled that lay outside of the arbitrary boundary of irregular presence, which Braby (2000) defined from earlier migratory events into the state. The faded brownish male sporting yellowed hind wing patches (which are white in newly emerged adults) was seen twice patrolling a circuit (1-2m above ground) in the grassy picnic ground at 1640h DST (1540h AEST). It swooped down to just above the grass during its second circuit to challenge a male of *Heteronympha merope* that had entered the picnic area. It fluttered above the intruder briefly before departing the area and was unseen thereafter.



Note 5. King (2012) illustrated a female of *P. ambrax* captured about 6km S of Cooktown; his specimen provides the northernmost authenticated record in the Wet Tropics. My observation, from north of Cooktown, was made in late afternoon (around 1630-1700h AEST) through the windscreen of a slow moving vehicle, and is a lower grade encounter event because of this. Peter Fox and I made an immediate search at the site but the female, which had slowly crossed the road in front of us, quickly vanished into dense rainforest, probably alarmed by the approaching vehicle. Although almost certainly this species in my opinion, it requires confirmation by a closer encounter when that opportunity presents itself. The only differential diagnosis could have been a large female of *Atrophaneura polydorus*, which has similar wings markings and coloration, but the standard *Papilio* flight-pattern did not match with that Troidine species and my field notes record that no red on the abdomen was noticeable as it flew only metres in front of us.

Note 6. This record of *C. cressida* is certainly not the first from this area but is additional evidence of the species presence; an earlier one from 'Burra Range' was made during June and July 1981 (Johnston 1984). My encounter event from many years ago, noted during a joint field trip with Michael Braby, seems outside of the western coverage of the species' range-filled map nonetheless (see Braby 2000). Subsequently, Atkins *et al.* (2003) included the species in a list from the Warang Homestead area and nearby gorges of the White Mountains National Park. Atkins personally surveyed during a scientific expedition in April 2000, but that paper includes records of this species (attributed to three other workers), which came from either the gorge area or Burra Range, or both.

Figures 1-3

Temperatures in outback Queensland can be very high for long periods from late October. Those butterflies that are more attuned to humid areas, where nectar or water may be more available to replenish fluid loss, may adapt accordingly to limit dehydration by reduced physical exertion at certain times of the day. At Bottle Tree Lookout, 58km NE of Hughenden (one of the locations listed in Table 1) I saw several species of butterfly, including a female of *P. aegeus*, fly across the basalt ridge about midday (between 1200-1220h), the latter provided the new record listed. However, by mid-afternoon, when temperatures were higher, very few butterflies of any species were active; most had likely sought shade as males of *P. aegeus* were seen to do at this site.

Figures 1 and 2 show two males of *P. aegeus* roosting on deeply shaded basalt at ground level beneath a large tree in woodland, during very hot weather (c. 37°C between 1400-1430h AEST). My very close presence did not alarm them unless my movements were rapid. They would fly back and forth in front of these rocks at such times, usually keeping within shade though, and settled on the rock surface repeatedly and sometimes on leaf litter (both relatively cool substrates but each potentially risky due to predation by spiders, lizards or other predators that lurk in deep shade).





Figure 3 shows the position of the males (in close proximity) as they roosted simultaneously on rock surface and on leaf litter (marked by arrows). These compromises in behaviour perhaps outweigh the risks of desiccation from hot winds when roosting higher up on tree foliage.



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- Photos Kelvin Dunn

The genus *Acraea* (Lepidoptera : Nymphalidae) - Peter Hendry

With the recent migration to Australia of the Tawny Coster (*Acraea terpsicore* (Linnaeus, 1758)), (see Creature Feature this issue), I thought it might be timely to take a look at the genus worldwide. It must be noted that due to a misidentification *A. terpsicore* had long been known as *A. violae* and many references in the literature and on the web refer to it as *A. violae*. As with much of the Lepidoptera the genus is in a state of flux, and has long been split into the subgenera *Acraea* (*Acraea*) and *Acraea* (*Actinote*). The genus is placed in the tribe Acraeini and until Harvey (1991) placed it in the subfamily Heliconiinae it was listed in the subfamily Acraeinae. Recent molecular work has made changes and a current listing of the tribe Acraeini, by Niklas Wahlberg, is available at <http://www.nymphalidae.net/Classification/Acraeini.htm>. It shows members of the old subgenus *Acraea* (*Actinote*) being placed in the genus *Actinote*, and the old subgenus *Acraea* (*Acraea*) becoming the genus *Acraea* with a subgenus *Acraea* (*Bematistes*). It also lists several *Acraea* as unplaced. This may further change as some believe the subgenus *Acraea* (*Bematistes*) will move to the genus *Bematistes*.

The genus is primarily Afrotropical with only four species occurring outside this region, these being, *Acraea andromacha* (Fig. 1) *A. meyeri* (Fig. 10) *A. moluccana* and *A. terpsicore*. A fifth species the Yellow Coster *Acraea* (*Actinote*) *issoria* is now referred to the genus *Actinote*. Like many of the Nymphalidae the larvae feed on plants which contain cyanogens making the larvae and adults poisonous to predators. This has led to them often being mimicked by more palatable species. During mating the males secrete a mating plug known as a sphragis which blocks the entrance to the



females mating tube, preventing successful matings by subsequent males. The sphragis is used by two other unrelated Australian species; the Clearwing Swallowtail (*Cressida cressida* : Papilionidae) and the Shouldered Brown (*Heteronympha penelope* : Nymphalidae). The mating habits of the *Acraea* have been described as "rough", with males being observed knocking the female out of the sky and using an opposite dorso-ventral orientation (facing opposite directions). This male dominant copulation behavior without any pre-copulatory ritual, followed by use of a sphragis and the harassment of mated females, led some to believe it led to genetic factors causing female dominant populations in some *Acraea* species (Sourakov and Emmel, 1997). However female dominant populations eventually were found to be caused by male killing bacteria (Jiggins, Hurst & Majerus, 1997).

Until the arrival of *Acraea terpsicore*, the only member of the genus *Acraea* to occur in Australia was the Glasswing (*A. andromacha* (Fabricius, 1775)) (Fig. 1). Eltringham, 1912, believed *andromacha* to be an incorrect spelling of *andromache*. The Glasswing with its almost transparent wings has a wingspan of 53-56 mm (Braby, 2000). The larvae (Fig. 2) feed on plants in the Passifloraceae and Violaceae families. It is a common visitor to my own backyard where it feeds on the introduced *Passiflora caerulea*.

A. andromacha is also often seen on my bush block west of Bundaberg where it is hosted by the native *P. aurantia*. The pupa (Fig. 3) with its white background and black markings with yellow gold circles, is rather stunning and on more than one occasion I have found them on the eaves of the house, some distance from the nearest host plant.

Unlike *A. andromacha* (Fig.1) many species of *Acraea* are coloured in reddish browns and orange and are quite stunning in their colouration. None more so than the Fiery Acraea (*Acraea acrita*, Hewitson, 1865) (Fig. 4).



Fig. 1

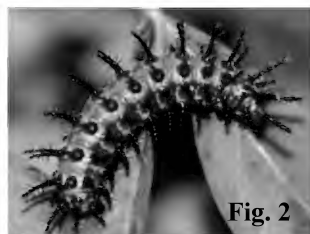


Fig. 2



Fig. 3



Fig. 4



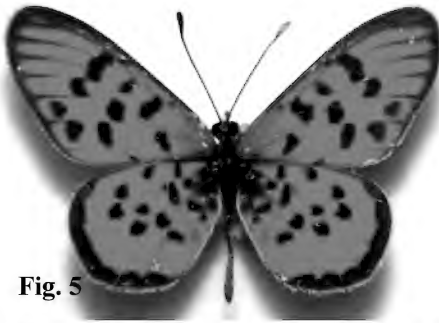


Fig. 5



Fig. 6

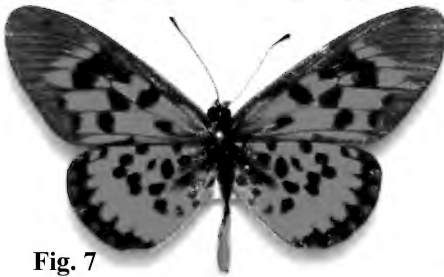


Fig. 7



Fig. 8

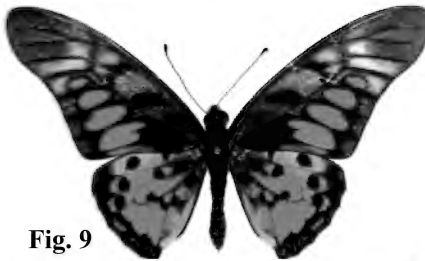


Fig. 9



Fig. 10

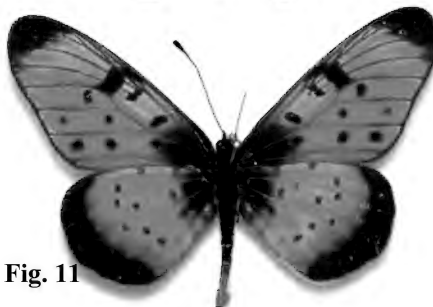


Fig. 11

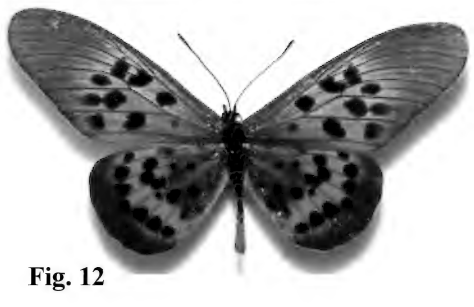
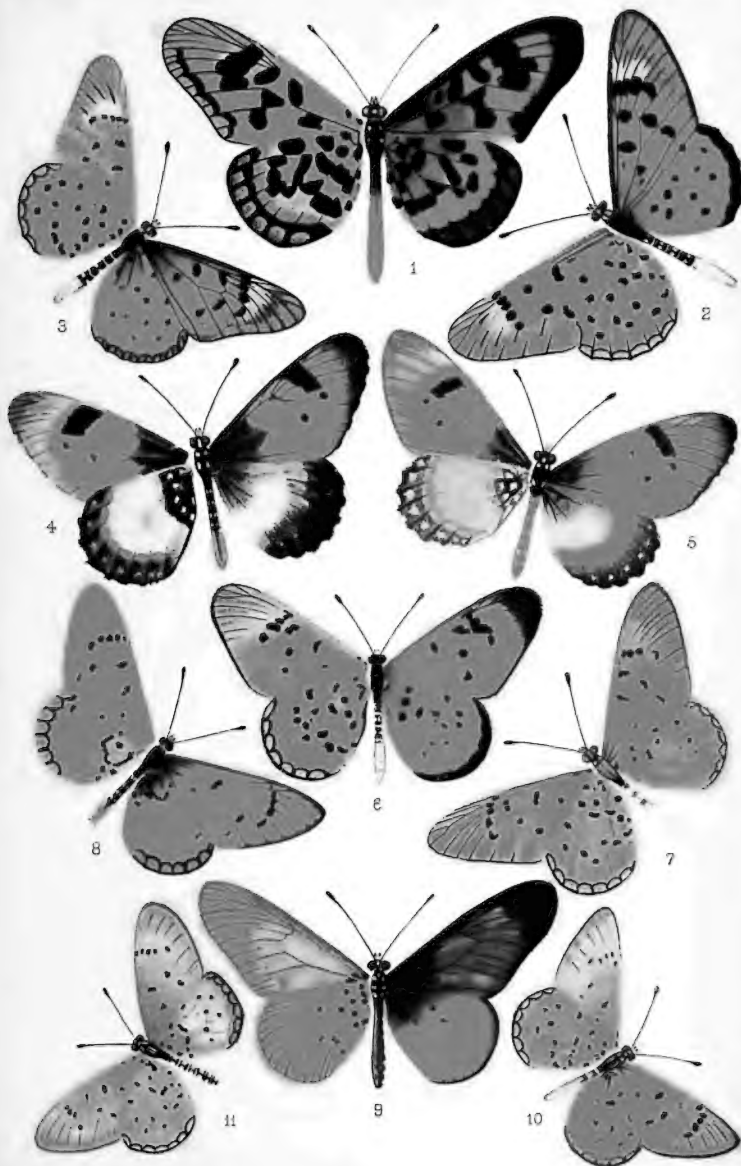


Fig. 12

Fig. 5 *Acraea buettneri* Fig. 6 *Acraea caecilia* Fig. 7 *Acraea cepheus*
 Fig. 8 *Acraea egina* Fig. 9 *Graphium ridleyanus* Fig. 10 *Acraea meyeri*
 Fig. 11 *Acraea natalica* Fig. 12 *Acraea rogersi*





H. Eltringham del.

West, Newman chr

NEW AND LITTLE KNOWN FORMS OF ACRAEA.



A. acrita occurs in South Africa, Angola, Zimbabwe, Mozambique, Malawi, Zambia, Tanzania and Zaire. Like the Tawny Coster, the Fiery Acraea may be undergoing a mini migration of its own. Migdoll, 1994, notes that for many years only one specimen had been recorded in South Africa, at Komatipoort. Since then it has been recorded many times. It is possible it is expanding its range further southwards and westwards. He also notes that the summer form is more fiery red than the winter form and gives its wingspan as 45-52 mm. The larvae feed on plants in the Passifloraceae family.

Acraea buettneri Rogenhofer, 1890, (Fig. 5) is found in forest margins and clearings, degraded forest and moist woodland in much of Zaire, Angola, Namibia and Zambia (Ackery, Smith & Vane-Wright, 1995). Nothing is published of its early stages or host plants.

Acraea caecilia (Fabricius, 1781) (Fig. 6) is found across central Africa from Senegal to Kenya and Tanzania (Ackery, Smith & Vane-Wright, 1995). It is a species without any orange colouration and more reminiscent of the Glasswing (*A. andromacha*). The larvae feed on plants in the families Turneraceae and Passifloraceae.

Acraea cepheus (Linnaeus, 1758) (Fig. 7) is found from Zaire, Nigeria, southwards to Angola and eastwards to Uganda, southern Sudan and Zambia (Ackery *et al.*, 1995). *A. cepheus* has a wingspan between 48-50 mm and the larvae feed on plants in the family Achariaceae (Flacourtiaceae).

Acraea egina (Cramer, 1775) (Fig. 8) is found in forests, up to 1600m, across central Africa from Sierra Leone to Ethiopia, Kenya, Tanzania and southward to South Africa (Ackery, Smith & Vane-Wright, 1995). Known as the Elegant Acraea, it has a wingspan between 62-96 mm and is thought to be the model for the mimic *Pseudacraea boisduvalii* (Doubleday, 1845) (Watson & Whalley, 1983). Along with the Papilionidae species *Graphium ridleyanus* (Fig. 9), the three form a mimicry complex. The larvae feed on plants in the families Achariaceae (Flacourtiaceae) and Passifloraceae.

Acraea meyeri (Fig. 10) : Named as *Acraea meyeri* by T. H. Kirsch in 1877, it was regarded as a subspecies of *A. moluccana* by Eltringham, 1912 and for a long time was treated as *Miyana meyeri*. *Miyana* was erected by Fruhstorfer in Seitz's Macrolepidoptera of the World Vol. 9 (1912-1915). *Miyana* was used by authors such as Barrett and Burns (1951) and D'Abrera (1971), however Parsons (1991), (1999) and Gotts and Pangemanan (2001) place it back in *Acraea* and it appears as such in Niklas Wahlberg's Acraeini list. *A. meyeri* has a distribution which covers mainland New Guinea and the islands Goodenough and Yule (Parsons, 1999). The food plants are listed by Gotts and Pangemanan (2001) as *Passiflora* species. Parsons (1999) notes that while females have been observed laying on *Passiflora foetida* and the cultivated Granadilla, these plants are toxic to the larvae and he surmises that *Adenia heterophylla* (Passifloraceae) may be the true host plant for *A. meyeri*. The larvae has



the branching spines typical of the Nymphalidae and the white pupa has black longitudinal stripes like *A. andromacha* (Gotts and Pangemanan, 2001). I note Gotts and Pangemanan use the spelling *andromache*. A form in which the yellow on the underside of the hindwing is replaced by white is known from some areas (Gotts and Pangemanan, 2001).

Acraea natalica Boisduval, 1847 (Fig. 11) is found from Kenya, Uganda and Tanzania southwards into Zaire, Zambia, Mozambique, Zimbabwe, Botswana and South Africa (Ackery *et al.*, 1995). Being originally named from Natal it is known as the Natal Acraea. It has a wingspan between 55-63 mm and a rather zigzag flight (Migdoll, 1994). The larvae feed on plants in the families Turneraceae and Passifloraceae.

Acraea rogersi Hewitson, 1873 (Fig. 12) is found across central Africa from Sierra Leone to Uganda and south-western Kenya, southward to Angola (Ackery, Smith & Vane-Wright, 1995). The larvae feed on plants in the Passifloraceae family.

Acraea zetes (Linnaeus, 1758) (Fig. 13) is found in deciduous woodland, savanna and thorn scrub in eastern and southern Africa; more frequently associated with evergreen forest in Zaire and West Africa (Ackery, Smith & Vane-Wright, 1995). Known as the Large Spotted Acraea, it has a wingspan in males of 55-65 mm and females 60-70 mm. It is a large slow flying Acraea which is on the wing throughout the year although less so in winter (Migdoll, 1994). The larvae feed on plants in the families Achariaceae (Flacourtiaceae) and Passifloraceae.



Fig. 13

In preparing this article I am indebted to Dominique Bernaud for the use of his image of the Fiery Acraea. I am also indebted to Jak Guyomar for access to his collection from which I photographed all set specimens of *Acraea*. The *Graphium ridleyanus* image is from my own collection. The images of the Glasswing, adult, larva and pupa are also my own. I would also like to acknowledge the Biodiversity Heritage Library and the Smithsonian libraries for the use of plate ii from Eltringham's Monograph of the African species of the Genus *Acraea*.

Below is the original explanation of plate ii from Eltringham's 1912 Monograph of the African species of the Genus *Acraea* - the names in blue are the current standing

1. *A. egina medea*, Cram. ♂, ? Senegal. (Berlin.)
2. *A. doubledayi arabica*, Eltr. ♂ (Type), Azvaki Ravine, Arabia. (Tring.)
Acraea arabica Rebel, 1899
3. *A. doubledayi doubledayi*, Guér. ♂, Abyssinia. (Tring.)



4. *A. welwitschii welwitschii*, Rogenh. ♂, Cerambè, Bihè, Angola. (Tring.)
Acraea welwitschi (Rogenhofer)
5. *A. welwitschii welwitschii*, Rogenh. ♀, Biuaba, Angela. (Tring.)
Acraea welwitschi (Rogenhofer)
6. *A. rhodesiana*, Wichgr. ♂, Rhodesia. (London.)
7. *A. ella*, Eltr. ♂ (Type), Benguella. (Tring.)
8. *A. aureola*, Eltr. ♂ (Type), Bihe, Angola. (Tring.)
9. *A. grosvenori*, Eltr. ♂ (Type), Rutschuru R. (Tring.)
Actinote grosvenori Eltringham, 1912
10. *A. equatorialis equatorialis*, Neave ♂, Kisumu. (Oxford.)
11. *A. equatorialis equatorialis*, Neave ♀, Kisumu. (Oxford.)

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Photos as previously credited



Life history notes on the Caper Gull, *Cepora perimale scyllara* (Donovan, 1805) **Lepidoptera: Pieridae** - Wesley Jenkinson



This pretty butterfly, previously known as the Australian Gull is encountered along coastal eastern Queensland and north-eastern New South Wales, including areas west of the Great Dividing Range in these two states. The species is also present in northern Western Australia, Northern Territory and from near Melbourne in Victoria.

In southeast Queensland it is seasonally common and the adults can be found in a varied range of forests and also suburban gardens. The breeding habitat in this region is chiefly dry rainforest and vine scrub where *Capparis* trees or shrubs are growing. Numerous species of *Capparis* are utilised for breeding and the females will often oviposit on host plants in quite exposed locations, resulting in successful adults. Although perhaps not migratory, the adults disperse from their local breeding areas after favourable rainfall.

Whilst actively on the wing, adults can be confused with two other similar looking *Pieridae* species. These are the Caper White (*Belenois java*) and particularly the female Yellow Albatross (*Appias paulina*). *Cepora p.s* is slightly quicker in flight than *B. java* and the adults are usually smaller than *A. paulina*.

Adult flight is fast and strong and they are typically observed flying around forest canopies and margins during sunny periods. Both sexes can be observed imbibing moisture from puddles (mud puddling) during extremely hot conditions. During cloudy or very hot sunny weather the adults settle with their wings closed on the upper surface of leaves in shady forest understorey. This can often occur within one or two metres of the ground. Both sexes are readily attracted to a wide range of native and introduced flowers.

Within Queensland the adults show slight variation in the width of the black marginal band on the wing upperside and the size of the white subterminal spots. The male hindwing underside is variable in colour from yellow to pale orange, while the female is usually pale orange. There is also a dry season form where the underside yellowish orange markings are replaced with brown in both sexes. The sexes can be separated by the width of the black marginal band on the upperside which is narrower in the male in comparison to the female.

Wingspans for the pictured adult upperside specimens are: males 47mm and females 49mm.





Cepora perimale scyllara
(Caper Gull) images
left to right: upperside
wet season form
male and female



Cepora perimale scyllara
(Caper Gull) images
left to right: underside
wet season form
male and female



Cepora perimale scyllara
(Caper Gull) images
left to right: underside
dry season form
male and female

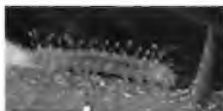
During February 2008, an egg-laying female was fluttering slowly around a host tree in dry vine scrub. She settled and curled her abdomen onto the upper side of a fresh young leaf. An egg was laid singly and the wings remained closed while ovipositing occurred. This egg was collected and raised through to an adult on Scrambling Caper (*Capparis sarmentosa*). When fresh shoots are scarce, several eggs may be laid on either side of a single leaf by different females. Occasionally the eggs are also laid on stems of the host plant.



Two day old eggs

The fresh egg was white later changing to orange, barrel shaped, approximately 0.5 mm wide x 1.1 mm high, with 14 vertical ribs and very fine horizontal lines between these ribs.

Raised in captivity, the first instar consumed the eggshell soon after emergence and later commenced feeding from the outer edge of a small soft leaf. Being raised on the small leaved *C. sarmentosa*, the early instar rested on the upperside along a leaf midrib or on the underside of a leaf next to the midrib. The later larval instar was also observed resting along a stem. The captive larva fed openly during daylight hours, completed five instars and attained an approximate length of 32mm.



1st instar larva



2nd instar larva





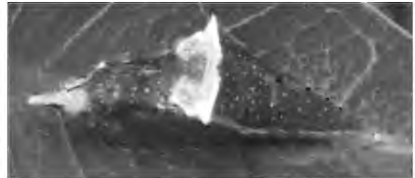
3rd instar larva



4th instar larva



5th instar larva



Pupa on *Caparris arborea*

In captivity the pupa, measuring 21mm in length, was located on the upper side of a leaf of the host plant. It was attached with silk by the cremaster and a central girdle.

The total time from egg to adult was almost three weeks, with egg duration of 3 days, larval duration 14 days and pupal duration of 12 days.

Within the new boundary of the Scenic Rim Regional Shire south of Brisbane, I have records of adults from all months of the year. The adults are more numerous from late spring, through summer until late autumn, being scarce from June to September. However, this generally relates to the timing of local rainfall triggering fresh growth of the host plants. In this location there are several generations per year, further observations are required to determine the exact number.

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Photos Wesley Jenkinson

Tube Spittlebugs (Clastopteridae: Machaerotinae) – Ross Kendall

On page 43 of the March edition (#68) of *Metamorphosis Australia* I asked if someone could identify the tube-like structures pictured here.

Soon after the magazine had been posted off, we received a message from Malcolm Tattersall which read: *I have an answer for the second "You Asked" question. I think they are "the calcareous tube homes of a*



Tube Spittlebug nymph (Machaerotinae: Clastopteridae)," to quote 'Servitude' on the discussion of Jean Hort's photo at http://www.flickr.com/photos/jean_hort/8454966737/. I don't know them in real life, though, so a supporting opinion would be good.

This message prompted a request to Martyn Robinson at the Australian Museum. He replied: *The image does indeed show the tubes formed by one of the tube spittlebugs – although I cannot determine the species from the tubes. The nymphs live within these tubes where they can feed while protected from elements and predators. The adults, however, are winged, free living, and usually found elsewhere on the host plants.*

He also wrote: *According to Australian Museum entomologist Dr. Dave Britton "Machaerotinae used to be treated at the family level in Australia, so you may see alternative classifications about the same thing. The ASCU (NSW Agricultural Scientific Collections Unit) web site has it as Clastopteridae: Machaerotinae <http://www1.dpi.nsw.gov.au/keys/cercopid/machaero/index.html> There are links to images of some adults, also references to earlier taxonomic and life-history papers"*

This was a good start but as a non-entomologist, I needed to try to get answers to my basic questions such as: "What do they look like?" "How big are they?" "What do they eat?" "What is their life cycle?" "Where does this insect belong in the world of invertebrates?" "Where is it found?" What follows is based on my research of the "literature" and the advice of Dr Murray Fletcher.



Tube Spittlebug
Chaetophytes admittens (Walker)

It seems that tube spittlebugs belong to the order **Hemiptera**, members of which are bugs. Bugs have syringe-like segmented beaks to suck liquefied contents out of other organisms, mostly from plants, but a few bugs such as assassin bugs suck out the juices of other insects. There are about 50,000 to 80,000 members worldwide.

The order **Hemiptera** is divided into four groups: the suborders **Heteroptera**, **Sternorrhyncha**, **Auchenorrhyncha** and **Coleorrhyncha**.

The **heteropterans** are "true bugs" such as Stink Bugs, Assassin Bugs, Ambush Bugs, Damsel Bugs, Lace Bugs, Flat Bugs, Seed Bugs, Stilt Bugs, Leaf-footed Bugs, Plant Bugs and Water Bugs. The wings of true bugs fold flat against the top of the body and the front wings usually overlap each other. They usually have a prominent beak that arises from the front of the head and hangs like a sheathed sword swung back under the head and body. The **Sternorrhyncha** consist of aphids, whiteflies, scales and their relatives. The **Auchenorrhyncha** consist of cicadas, treehoppers, froghoppers or spittlebugs, leafhoppers and planthoppers. These sapsuckers have uniformly membranous wings usually angled along the body and their beaks are thin and pressed closely under the head. The **Coleorrhyncha** includes only the creeping moss bug family **Peloriidiidae** and are the sister group to the **Heteroptera**.



It is to the spittlebug or froghopper superfamily (**Cercopoidea**) of about 2500



Tube spittlebug
Machaerota pugionata (Stål)

members that the very specialised group of tube spittlebug species belong. Female spittlebugs insert their eggs into plant tissue using a narrow ovipositor. The nymphs tap sap coming up from the roots of plants (xylem) rather than the sugary fluid flowing down the phloem vessels. The xylem sap has a large percentage of water that is pumped out of the body as fast as the sap is sucked in. This water has materials added which allow the insect to blow bubbles to surround it during its several nymphal stages. The same process is used by true

spittlebugs (Cercopidae: Aphrophorinae) which live in their “spittle” on plants without secreting calcareous tubes. [Ed: see “You Asked” article by Moss & Hutchison on spittlebug *Amarusa australis* (Jordan) Cercopidae: Aphrophorinae, in *Metamorphosis Australia*, issue 52, March 2009]

The tube spittlebugs (subfamily **Machaerotinae**) are a very specialised group with ten known species in Australia; the genus **Hindoloides** with one species; the genus **Chaetophyes** with four species; the genus **Pentinariopyes** with two species; the genus **Polychaetophyes** with one species and the genus **Machaerota** with two species. There are eleven known species in Eastern Indonesia and west New Guinea. The nymphs secrete fluids to construct calcareous tubes on the stems where they feed and immerse themselves in a rather clear fluid excretion inside the tubes which are composed of around 75% calcium carbonate. A kind of plate on the rear of a nymph “seals” the opening of the tube. Some tubes are curved like a cow’s horn while others are shaped like a spiral snail shell.



Spiral tube of *Hindoloides appendiculata*

Henry Hacker (1922) wrote: “*The first indication that the insect is about to emerge is the appearance of small bubbles at the mouth of the tube. This occurs in early spring, generally in the evening or early night. Viewed through a lens at this stage, the posterior end of the nymph is seen moving from side to side; this end protrudes for about a second, evidently to obtain a supply of air, and then retracts, after which fresh bubbles are blown; this renewing of the air supply takes place at intervals. The operation continues for about an hour, by which time a large mass of froth has been produced, covering the mouth of the tube and hanging over the side. When about to emerge, the nymph forces its way to the top of the tube, protruding its posterior end first until the legs have reached the lip. It then swings itself over, and with the head now upward it climbs down the outer side of the tube until it is merged into the froth which has accumulated on the lower side. There is constant movement inside the*



mass of froth, caused by the insect getting out of its nymphal skin. The froth now gradually subsides; all movement has ceased and the newly-emerged insect is seen clinging to the empty nymphal skin, which is then clinging to the side of the tube.

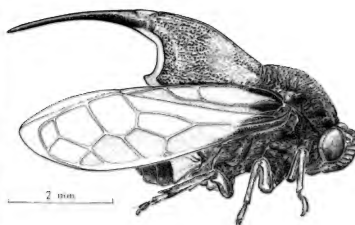
The pale-yellow wingless insect remains quite motionless. After a short interval tiny tegmina and wingbuds begin to appear. These expand rapidly, and in half an hour from the time they were first seen, are fully developed. While this growth develops and for some time later, the wings hang down perpendicularly; they are suddenly flexed one or twice, and closed to their normal roof-like position. At this stage, though rather soft, the insect is able to walk and jump, but if left disturbed it will remain quietly on the twig until the next day.

The time occupied by the metamorphosis of this insect is about an hour, and the total period from first appearance of the froth about two hours. The capture of adult specimens by me in September and January proves that there are two broods a year."

Adult tube spittlebugs suck copious amounts of fluid from the xylem and squirt out the surplus water. They vary in size from 3mm to 7mm in length and range from yellowish green to pink and black in colour.



Late stage nymph removed from its tube



Machaerota finitima (Jacobi)

I am now better informed and in future will look more carefully for these rather unique insects when in the "bush".

I wish to thank Dr Murray J. Fletcher, Visiting Scientist, Orange Agricultural Institute, Adjunct Professor, Faculty of Science and Agriculture, Charles Sturt University for his clarification of the taxonomy of the order Hemiptera,



Malcolm Tattersall for his initial identification and Martyn Robinson and Dr Dave Britten of the Australian Museum for their advice.

Colour images of Tube Spittlebugs are used with the permission of NSW Trade and Investment - Agricultural Scientific Collections Unit.

Black and white images are from "*The Insects of Australia, A Textbook for Students and Research Workers*."

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Important New Distribution Records for the Cabbage White, *Pieris rapae* (Linnaeus) (Lepidoptera: Pieridae), in Australia - *Kelvyn L. Dunn*

E-mail: kelvyn_dunn@yahoo.com

Summary

This paper documents 50 new locations for *Pieris rapae* (Linnaeus) in Australia that fall outside the boundaries of the species' distribution, as based on the range-filled map provided by Braby (2000).

Introduction

Many keen insect enthusiasts who occasionally visit remote areas of Australia often pay little attention as to whether the Cabbage White (*Pieris rapae*) is present or not. It is not hard to imagine why; it is not a native species, nor is it colourful, and neither is it rare. Its encounter in the field therefore stirs little collector interest as relatively short museum series would testify. Likewise, for those whose focus has been on things rare and infrequent, the documentation in the literature of many casual sightings over the decades will have more than likely not occurred. As a result, the known distribution that Braby (2000) presented is patchy and under-representative in some areas where the butterfly is likely widespread. Not surprisingly, its main distribution coincides with those areas where extensive butterfly observations have repeatedly taken place over the many decades of collector activity. To help rectify this



imbalance, I opportunistically investigated the distribution of the Cabbage White, over a five-year period (2007 to 2012), to determine the extent of its occurrence in the inland and the extent of its continuity in some coastal areas where knowledge gaps in its distribution were evident.

Discussion

The Cabbage White is conspicuous wherever it occurs in Australia; its crooked flight helps distinguish it, at a moderate distance, from *Appias*, *Belenois*, *Cepora*, *Catopsilia* and other white butterflies with which it bears some resemblance. I identified most adults encountered without the requirement of handling; a small number was captured and released unharmed, and very occasionally I preserved vouchers, but in doing so, it was kept in mind that museum space for common butterflies is limited and judiciously rationed – indeed, the material support for the distribution of this particular exotic is no exception here. That clarified, the 50 new locations where I found this butterfly across five states (Table 1), listed from north to south and with geocodes resolved to one minute, now add to the knowledge base and expand upon the historic literature and museum records used by Braby (2000) to construct his range-filled map.

The survey findings (Table 1) impress that the Cabbage White (Figure 1) extends much farther inland in New South Wales and southwestern Queensland, and in southwestern Western Australia, than was generally supposed. The results also show that the distribution in coastal South Australia is more extensive than was documented earlier by Braby (2000). Since then, Pierce (2010) has listed solitary records from Bourke NSW and Cunnamulla Qld, each made in June 2008, and each supports my later encounters in and near both outback towns in 2011 and 2012. In



Fig. 1 Female Cabbage White
Photo Graham MacDonald

addition, two records obtained recently in November 2012 from Ceduna SA, including one from 12km east of that town (Pierce 2013), add confirmation to my earlier encounters in and about that town in 2008; the currently known distribution extends westward to Penong. Similarly, the actual distribution in Tasmania includes more of the island than was suggested in the range-filled map by Braby (2000); that work had overlooked some eastern and western coastal records previously included on a point-plotted map of the state (see Dunn 1999). Since then, I have recorded a few other new locations in the remote northeast of the island and in conjunction with my earlier ones, these testify to a wide eastern coastal presence of the Cabbage White in that state.

The Cabbage White is largely associated with introduced crop-plants in townships and so has a localised or mosaic presence near settlements, far-wandering or



migratory adults aside, but in some southern coastal regions including National Parks, naturalised cruciferous weeds evidently sustain populations remote from human enterprise (Braby 2012, Faithfull & Dunn 2012). The availability of introduced hosts in both residential areas and rural farmlands means that breeding populations of this butterfly are almost certainly widespread in inland NSW. The records in Table 1 might appear as few and widely dispersed, but that is because only *selected* records for the regions concerned are included. I recorded many other sites in close proximity to these towns and in neighbouring or intermediate areas too (Dunn & Dunn database) – far too many to list comprehensively here. When taken together these and the tabled results underpin a considerably broader distribution in the states concerned. Finally, for those who wish to extend upon my study, a search for the Cabbage White in townships farther inland in the states concerned could become a useful focus for the future; and, importantly, it will help record the expansion of the species in Australia since its accidental introduction early last century.

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Table 1 Fifty significant locations for *P. rapae* beyond its known range in Australia

Location	State	Geocode	Date	Format
Kalbarri	WA	27°43'S, 114°10'E	14 Nov 2008	Obs
Northampton	WA	28°21'S, 114°38'E	17.Nov 2008	Obs
Port Denison	WA	29°16'S, 114°55'E	18 Nov 2008	Obs
2km S of Leeman	WA	29°58'S, 114°58'E	18 Nov 2008	Voucher
Koorda	WA	30°50'S, 117°29'E	11 Nov 2008	Obs
Regans Ford	WA	30°59'S, 115°42'E	12 Nov 2008	Obs

Continued on next page

Table 1 (contd.)

Location	State	Geocode	Date	Format
Mukinbudin	WA	30°55'S, 118°12'E	11 Nov 2008	Obs
8.1km E of Southern Cross P.O.	WA	31°15'S, 119°24'E	11 Oct 2008	Obs
Merredin	WA	31°29'S, 118°16'E	10 Nov 2008	Obs
Yanchep Beach	WA	31°33'S, 115°37'E	19 Nov 2008	Obs
Narembeen	WA	32°04'S, 118°24'E	21 Nov 2008	Voucher
Norseman	WA	32°12'S, 121°47'E	24 Nov 2008	Obs
Kondinin	WA	32°30'S, 118°16'E	21 Nov 2008	Obs
West River, 37km WSW of Ravensthorpe	WA	33°40'S, 119°41'E	23 Nov 2008	Voucher
Hopetoun	WA	33°57'S, 120°07'E	17 Oct 2008	Obs
Stirling Range NP	WA	34°19'S, 118°12'E	23 Nov 2008	Obs
Rangers Station				
Northcliffe	WA	34°38'S, 116°07'E	22 Oct 2008	Obs
Denmark	WA	34°58'S, 117°21'E	21 Oct 2008	Obs
Albany	WA	35°00'S, 117°52'E	20 Oct 2008	Obs
Penong	SA	31°56'S, 133°01'E	07 Oct 2008	Obs
Thevenard near Ceduna	SA	32°09'S, 133°39'E	07 Oct 2008	Voucher
Streaky Bay	SA	32°48'S, 134°13'E	24 Oct 2007	Voucher
Minnippa	SA	32°51'S, 135°09'E	23 Oct 2007	Obs
Port Kenny	SA	33°10'S, 134°41'E	23 Oct 2007	Obs
Darling River (near Rotary Park), Bourke	NSW	30°05'S, 145°57'E	26 Sep 2012	Voucher
Red Earth White Cliffs	NSW	30°51'S, 143°05'E	21 Oct 2011	Obs
Tilpa	NSW	30°56'S, 144°25'E	23 Oct 2011	Obs
Bunker Creek, 23km S of White Cliffs	NSW	31°02'S, 143°03'E	21 Oct 2011	Voucher
Darling River, Wilcannia	NSW	31°33'S, 143°23'E	21 Oct 2011	Obs
Broken Hill	NSW	31°58'S, 141°27'E	22 Oct 2011	Obs
Cobar	NSW	31°30'S, 145°50'E	25 Sep 2012	Obs
Copi Hollow, W of Menindee	NSW	32°16'S, 142°23'E	22 Oct 2011	Obs
Copi Hollow, W of Menindee	NSW	32°16'S, 142°23'E	22 Oct 2011	Obs
Ivanhoe, at sports field	NSW	32°54'S, 144°18'E	24 Sep 2012	Voucher
Muggebah Creek No. 2, N of Booligal	NSW	33°46'S, 144°55'E	19 Oct 2011	Obs



Table 1 (contd.)

Location	State	Geocode	Date	Format
Torrens Creek	Qld	20°46'S, 145°01'E	28 Oct 2012	Voucher
Isisford	Qld	24°16'S, 144°26'E	03 Oct 2012	Obs
Blackall	Qld	24°26'S, 145°28'E	02 Oct 2012	Voucher
Tambo	Qld	24°53'S, 146°15'E	26 Oct 2011	Obs
Augathella	Qld	25°48'S, 146°35'E	25 Oct 2011	Obs
Charleville	Qld	26°24'S, 146°15'E	01 Oct 2012	Obs
Morven	Qld	26°25'S, 147°07'E	30 Sep 2012	Obs
Wyandra	Qld	27°15'S, 145°59'E	27 Sep 2012	Obs
1km S of Cunnamulla	Qld	28°05'S, 145°41'E	27 Sep 2012	Released
Gladstone	Tas	40°58'S, 148°01'E	13 Nov 2007	Obs
Toddys Plain, 8km SW of Waterhouse	Tas	40°58'S, 147°34'E	13 Nov 2007	Obs
Pyengana	Tas	41°17'S, 148°01'E	11 Mar 1996	Obs
St Helens	Tas	41°20'S, 148°15'E	11 Mar 1996	Obs
St Marys	Tas	41°35'S, 148°11'E	11 Mar 1996	Obs
Bicheno Lookout	Tas	41°52'S, 148°17'E	11 Mar 1996	Obs
Queenstown	Tas	42°05'S, 145°33'E	11 Nov 2007	Obs

***Oxycanus beltista* (Lepidoptera : Hepialidae) - Peter Hendry**

Late on the afternoon of the 27th April 2013, Peter Kuttner and myself set up a light sheet on private property on Mt. Tamborine S.E. Queensland. The light was turned on and we departed for dinner at the local Indian restaurant. Upon our return we were delighted to find a specimen of the family Hepialidae on the sheet. Peter set up his video camera and recorded a short video of the moth. No sooner had he finished when another Hepialid landed on the sheet. As we could only see the forewing at the time, on which the markings were completely different to the previous one, we concluded we had a second species. Peter recorded another short video of this specimen and, as before, no sooner had he finished when another Hepialid landed on the sheet. Based on the markings of the forewing another species! By now alarm bells were starting to ring, did we have three species or one variable species?

As the night progressed we recorded seven Hepialid specimens, all males. The following day as I began to set them it was clear by the salmon pink on the hind wing and abdomen, that they were all the same species. In spite of days searching I was unable to name it and finally requested the help of Ted Edwards. Ted informed me it was *Oxycanus beltista*. Armed with a name I was able to search further and came up with the original description by A.J. Turner in 1926, (Turner, 1926). It was named



from a single specimen and one wing. Turner records it was collected at Mt Nebo near Brisbane in May and goes on to say "One specimen with head mutilated and legs missing picked up on the road after mid-day, not quite dead, and in good condition otherwise". He surmised it was attacked by a bird or lizard and a further search revealed a hind wing of a second specimen. He was so enchanted with it he called it the finest species yet found of this genus which at the time was *Porina*. He gave it the name *beltista* meaning the best.

Turner's type specimen is figured in Tindale's *Revision of the Australian Ghost Moths III*, (Tindale, 1935) where he gives the actual date of collection as May 27th 1923. Tindale examined a further 3 males from Blackbutt which he concludes may not be conspecific with Turners type but by the descriptions given they certainly have affinity with some of mine. Tindale also notes that as with several *Oxycaenus* species the female is unknown. To this day I have found no record of a female.

A trip to Mt Tamborine a fortnight later with Peter Kuttner, John Moss and Wes Jenkinson produced two more male specimens. Peter and I returned to the original site in June and early July, four specimens were recorded in June and none in July. On the Life Unseen website, http://lifeunseen.com/index2_list_279.php, there is a series of photos of an unnamed Hepialid recorded at the Bunya Mountains in June 07, these are all *O. beltista* males. I discovered in the collection of the late Jim Pickering, in my care, an unnamed male Hepialid collected from Mt Nebo 22nd July 1977 which I can now attribute to *O. beltista*. As with other Hepialids this specimen has faded with time and no longer holds the salmon pink on the hind wing and abdomen. Having also mothed on Mt. Tamborine on the 24th March and not seeing any *O. beltista*, I can conclude that the flight times of this species fall between April and June and that it is probably restricted to mountainous regions in S. E. Queensland.

In preparing this article I am indebted to Ted Edwards for his identification of the species involved and to Peter Kuttner who set up the sites and accompanied me at the light sheet.

P.S. Nick Monaghan of the Life Unseen website has since updated his website to name the unknown Hepialids.

References

- Turner A.J. 1926. Studies in Australian Lepidoptera. *Transactions of The Royal Society of South Australia* 50:120-155
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Photos Peter Hendry





Fig. 1



Fig. 2

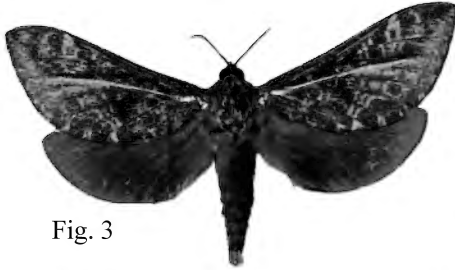


Fig. 3



Fig. 4



Fig. 5



Fig. 6

Oxycanus beltista : Figs 1-5 showing variation in forewing patterns,
Fig. 6 specimen from 1977 showing how they fade with age

Butterfly observations in Bundanoon NSW (continued from Issue 69) –

Alan Hyman

One of the popular walks through the eucalypt forest commencing at Morton National Park's Bundanoon entrance is a 3.5km loop. Along this road in summer one can find – in addition to the ubiquitous Common Brown (*Heteronympha merope*) – the Eastern Ringed Xenica (*Geitoneura acantha*) and the Marbled Xenica (*G. klugii*) commonly flying together. The local subspecies of the Varied Sword-grass Brown (*Tisiphone abeona abeona*) can also be observed wherever its food plant (*Gahnia*) occurs – generally along roadsides where ditches are constantly wet. Early in the year when a limited hazard reduction burn was being proposed in the section of the Park where we volunteer, I requested the field staff to consider excluding these *Gahnia* corridors from the operation. This was agreed to and the plants were conspicuously marked



with pink tape so that they would be left untouched during the burn, the theory being that any *T. abeona* eggs, larvae or pupae on the plants would be spared. Since the operation, the wider surrounding understorey is now regenerating satisfactorily – and we were subsequently rewarded with fresh specimens of this superb black and orange butterfly fluttering around the area – a satisfying example of co-operation in butterfly conservation. Just occasionally a few individuals of the Silver Xenica (*Oreixenica lanthoniella*) are encountered, although a small colony persisted for some years in a part of our local Currabunda Wetland project and may yet survive. Other species occurring in the Park include the Brown Ringlet (*Hypocysta metirius*), the Rock Ringlet (*H. euphemia*) and a spring species, the Forest Brown (*Argynnis cyrila*).



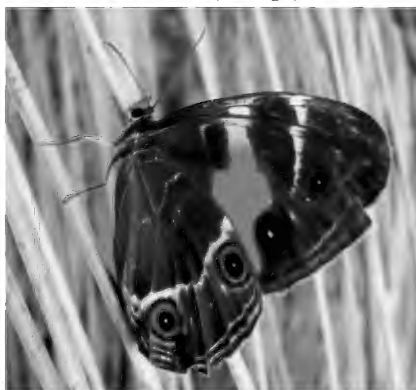
Eastern Ringed Xenica
(*Geitoneura acantha*)



Marbled Xenica (*G. klugii*)

Subfamily Danaidae is represented by three species, but none are common. I have on rare occasions observed the Monarch (*Danaus plexippus*), the Lesser Wanderer (*Danaus chrysippus*) several times and a single Common Australian Crow (*Euploea core*) once visited our garden. However, Australia's sole Heliconiinae representative, the Glasswing (*Acraea andromacha*), makes an appearance in favourable seasons.

With translucent wings and gliding flight, it could perhaps be mistaken for a dragonfly at a distance. Three common butterflies with rather similar sizes, shapes and flight characteristics in the subfamily Nymphalinae are present – the Meadow Argus (*Junonia villida*), the Yellow Admiral (*Vanessa itea*) – and the Australian Painted Lady (*Vanessa kershawi*) which often alights on roads or trees to take in the late afternoon sun. The Tailed Emperor (*Polyura sempronius*) – subfamily



Varied Sword-grass Brown
(*Tisiphone abeona abeona*)



Charaxinae – very rarely makes a solitary appearance, dipping and arcing upwards before speeding off again to its unknown destination.



Meadow Argus (*Junonia villida*)



Australian Painted Lady (*Vanessa kershawi*)

Although there may be a dozen or more Blue (*Lycaenidae*) species, most do not seem to be particularly common. Exceptions include the Common Grass-blue (*Zizina labradus*) which often appears as a scattering of blue-grey flakes across our lawns. Another is the Imperial Hairstreak (*Jalmenus evagoras*) whose gregarious larvae, pupae, freshly emerged adults and attendant ants are sometimes found together on the leaves and stems of *Acacia*. Encountered along some sections of the Park roadside is an exquisite small butterfly whose scientific name is larger than the insect itself. This is the Yellow-spotted Blue (*Candalides xanthospilos*) – its intense purple-black upper sides with pale orange forewing spots contrasting with silky grey undersides such that in flight it ‘flashes’ in a similar manner to the Black Jezebel (*Delias nigrina*). I have observed on several occasions individuals (which I presume to be this species) with black rather than purple-black upper wing colouration and forewing spots which are ivory-white instead of pale orange. Undersides are as for the ‘standard’ butterfly. The colours might have faded (although the butterflies themselves seemed to be in good condition) but possibly they were variations on the normal form. I would be interested to know whether other persons have made similar sightings. Most other species occur as individuals and are seen only on an occasional basis. For completeness, these are listed below with minimal comment. A Pencilled Blue sp. (*C. absimilis*?) rare; Varied Dusky Blue (*C. hyacinthina*) uncommon; Long-tailed Pea-blue (*Lampides boeticus*) occasional; Plumbago Blue (*Leptotes plinius*) single specimen only; Silky Hairstreak (*Pseudalmenus chlorinda*) very rare; Fiery Copper (*Paralucia pyrodiscus*) and Chequered Copper (*Lucia limbaria*) – both species rare and only encountered north of the town in a degraded weed-covered paddock divided by an eroded creek – an area which we were attempting to regenerate; Short-tailed Line-blue (*Prosotas felderi*) single specimen only; Double-spotted Line-blue



(*Nacaduba biocellata*) uncommon. There are almost certainly other species in the area but their presence and status require further observations and confirmation.

An assortment of skippers (Hesperiidae) has been observed. The noteworthy species is the reasonably common Splendid Ochre (*Trapezites symmomus*) whose comparatively large size and bright colours (for a skipper) make it instantly distinguishable. Others include the Lilac Grass-skipper (*Toxidia doubledayi*); Dingy Grass-skipper (*T. peron*); Barred Skipper (*Dispar compacta*); Spotted Sedge-skipper (*Hesperilla ornata*); Bright Shield-skipper (*Signeta flammeata*); and a Grass-dart sp. (*Ocybadistes?*). A number of other species has been noted but again further observation is needed for positive identification.



Splendid Ochre (*Trapezites symmomus*)

It might be of interest to mention a selection of the local day-flying moths, which unlike many of their nocturnal counterparts are butterfly-like in their colours and habits. Many of our local diurnal moths have colour patterns of black with cream or white markings, including the Grapevine Moth (*Phalaeniodes glycinae*); the Magpie Moth (*Nyctemera amica*); a Cruria species (*C. synopla?*) found along the Park roads; the rare and cryptically marked Mistletoe Moth (*Comocrus behri*) and the equally rare Joseph's Coat Moth (*Agarista agricola*) which sports the additional colours of red, pale blue and deep yellow. In contrast, there is the delicate Heliotrope Moth (*Utetheisa pulchelliodes*), its silky-white forewings subtly speckled with orange and black spots. A geometrid, the Triangular Moth (*Epidesmia chilonaria*) indeed forms a perfect brown triangle embellished with a wavy line when at rest but reveals bright orange upper surfaces on its hind wings in flight. As it flits amongst the understorey, it reminds me (in appearance if not flight pattern) of the Brown Ringlet (*H. metirius*) whose territory it cohabits. Obviously these colours are well suited for blending into the leaf-littered and light-dappled environment.

By the beginning of May, the butterfly season in Bundanoon is virtually over, with just the odd remnant Brown (mostly *Heteronympha* spp.), Yellow Admiral (*V. itea*), Meadow Argus (*J. villida*) or Cabbage White (*P. rapae*) soldiering on. Owing to the local climatic conditions, the next four to five months normally produce few lepidopteran sightings of significance. After a bumper 2010-2011 summer season the last couple of years have generally been disappointing butterfly-wise. Numbers of species and individuals (with a few exceptions) have been down, and it is to be hoped that this is not a trend for the future. Butterflies are endangered from many quarters – land clearing and development, pollution, pesticides and ‘natural’ disasters. Being highly visible, their relative presence or otherwise establishes an ideal barometer for



gauging the well-being of other insect species and by extension, the health of the wider ecosystem.

I admit to having no formal entomological background – hence the informal approach to the text (my ‘expertise’ is graphic and typographic design). My interest in butterflies however goes back to school days, when a friend and I collected in our local inner Sydney suburbs – I think pictures in a book or on cereal cards initially inspired us. Our methods were primitive (homemade nets and cardboard boxes), presentation and preservation unsophisticated, documentation non-existent. In the ‘70s and ‘80s, armed with more knowledge and proper equipment, I assembled a small collection with specimens mainly obtained from Sydney’s northern bush areas, southern NSW and northern Queensland. With today’s conservation ethics in mind photography and observation have now almost supplanted field collection. My wife Wendy and I have lived in Bundanoon since the end of 2000 after escaping the environmental stresses of Sydney. We spend a great deal of time in a large garden and belong to volunteer groups working in the adjacent section of Morton National Park (track and other maintenance) and the local Currabunda Wetland (bush regeneration and planting). If the modest informal notes made during these activities stimulate an awareness of recording butterflies and moths in local or out of the way locations, then they will have achieved their purpose.

Photos Alan Hyman

NEW HOST PLANT

A new host plant for the Satin Azure (*Ogyris amaryllis meridionalis*) – Geordie Paton

Several months ago I noticed Satin Azure butterflies active around mistletoes growing on host trees in Broome, Western Australia and photographed an adult on that mistletoe. Ross Kendall and John Moss confirmed that the mistletoe is the Twin-leaved Mistletoe (*Amyema benthamii*).

It was suggested to me that I “band” a branch near the mistletoes to see if larvae would shelter and also pupate there. They promptly did so and I subsequently collected some pupae to observe and to verify the butterfly species.



Satin Azure (*Ogyris amaryllis meridionalis*) on
Amyema benthamii



The butterflies that emerged were certainly Satin Azures so I can confirm that *Amyema benthamii* is a host plant of these butterflies.



Satin Azure larva



Satin Azure pupa

Photos Georgie Paton

EXCURSION REPORT

BOIC Excursion Report: ramble and sample at Mt Cotton -

Alisha Steward

On Saturday 23rd March 2013 we held an excursion to complement the large, predatory water bugs creature feature that appeared in Issue 68 of 'Metamorphosis Australia' earlier this year. We aimed to collect and observe freshwater invertebrates, but the day inevitably led to the observation of other invertebrates too - including a multitude of butterfly species.

The excursion was held on John and Lois Hughes' beautiful acreage property at Mt Cotton, where an enthusiastic group of ten took a leisurely ramble along the banks of an unnamed tributary within the Tingalpa Creek catchment. The clear, flowing water of the creek was densely fringed with rainforest tree species – many of them being butterfly host plants. Some were naturally-occurring, whereas others had been planted over many years by Lois and John.

We intended to start the excursion with a demonstration of freshwater invertebrate collecting techniques; however, it took over half an hour to simply walk the 50 metres or so to the creek, as we encountered so many other invertebrates along the way! Refer to the taxa list at the end of the article.

My day job is working as a freshwater scientist, and I (eventually!) gave the demonstration of what I do now and then for my bread and butter – I collected a sample of freshwater invertebrates with a mesh 'dip' net. Although I have university qualifications, anyone with a little guidance can collect such a sample – face downstream while standing in the creek, and agitate the stream bed with your feet. Then sweep the dip net through the water to collect any suspended material as it is swept downstream. This material (cloudy water, leaves, dirt, debris) will also contain invertebrates that can be retained for later analysis. Continue the sweeping motion as you work upstream (10 metres is a sufficient distance to collect a representative



sample). The dip net can also be used at the edge of the stream, which will result in the collection of a different suite of invertebrates as the edge has different habitat characteristics than flowing parts of the stream. Flow can be low, or negligible, at the edge of a stream, so you must use the net in a slightly different way – stand perpendicular to the edge and sweep the net through the water with upward thrusts.

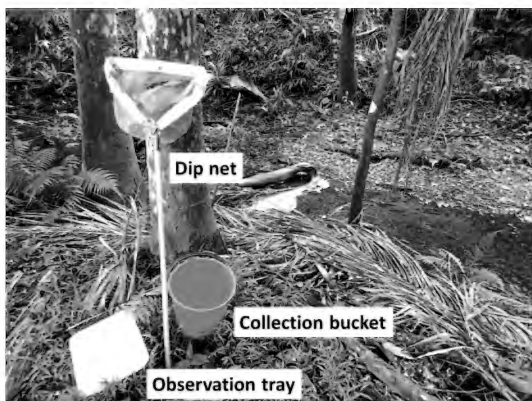


Figure 1. Equipment for sampling freshwater invertebrates

Figure 1 shows the collection equipment that we used. After the sample was collected, it was transferred to a bucket containing clean water, and then taken back to a table where we could pour the contents into a white observation tray.



a) Damselfly larva (Synlestidae)



b) Mayfly larva (Leptophlebiidae)



c) Shrimp (Atyidae)



d) Yabby (Parastacidae)

Figure 2. Freshwater invertebrates collected from the creek. These individuals were photographed in white plastic observation trays, and were returned to the creek once the photo-shoot was complete.



In the tray we found aquatic insects and crustaceans including damselfly and dragonfly nymphs, mayfly larvae, yabbies, and shrimps (a complete list of taxa is provided at the end of the article) (Figure 2). The invertebrates were then returned to the creek.

Some of the invertebrates that were collected are indicators of good water quality. An Australian system of assessing river water quality called SIGNAL (Stream Invertebrate Grade – Average Level) uses freshwater invertebrates as indicators (Chessman, 2003). Each invertebrate taxon is assigned a score between 1 and 10 – with 1 being the most tolerant and 10 being the most sensitive. Five types of sensitive



Figure 3. Lunch break, creekside



Figure 4. Lois Hughes (right) with keen onlookers examining a tray of water scorpions (Nepidae) and tadpoles (*Mixophyes* sp.) collected from the dam, and inset – a close-up of the tray.

invertebrates collected during the excursion had SIGNAL scores of 7 or greater: Calamoceratidae (SIGNAL score = 7), Corydalidae (7), Gripopterygidae (8), Leptophlebiidae (8), and Synlestidae (7). More details about using SIGNAL are given in Chessman (2003).

After a spot of lunch (Figure 3), we continued our ramble downstream along the creek and made our way to the dam, where we collected some large specimens of our ‘creature feature’ bugs – water scorpions (Nepidae) (Figure 4)! The water scorpions lived up to their fierce name, and within seconds one individual had grabbed a large beetle larva and had started to consume it!

Of interest (but not of the invertebrate kind!) is the sighting of large frog tadpoles from the genus



Mixophyes – most likely the Great Barred Frog (*Mixophyes fasciolatus*).

A great day was had by all. Until the next excursion...

Photos Alisha Steward

Reference

Chessman, B. 2003. SIGNAL 2.iv – A Scoring System for Macro-invertebrates ('Water Bugs') in Australian Rivers, Monitoring River Heath Initiative Technical Report no 31, Commonwealth of Australia, Canberra.

Report is available on the web:

<http://www.environment.gov.au/water/publications/environmental/rivers/nrhp/pubs/signal.pdf>

List of invertebrates – aquatic

Blackflies – larvae (Simuliidae)

Caddisflies – larvae (Calamoceratidae, Ecnomidae, Leptoceridae)

Damselflies – nymphs (Synlestidae)

Diving beetles – larvae (Dytiscidae)

Dobsonflies – larvae (Corydalidae)

Dragonflies – larvae (Gomphidae)

Mayflies - larvae (Leptophlebiidae)

Shrimps (Atyidae)

Stoneflies – larvae (Gripopterygidae)

Water scorpions (Nepidae)

Water spiders (Pisauridae)

Yabbies (Parastacidae)

List of invertebrates – terrestrial

Australian Leafwing – adult (*Doleschallia bisaltide*)

Blue Tiger – adult (*Tirumala hamata*)

Blue Triangle – adult (*Graphium sarpedon*)

Caper Gull – adult (*Cepora perimale*)

Common Crow – adult (*Euploea core*)

Common Pencil-Blue – female laying eggs on *Macadamia* (*Candalides absimilis*)

Large Grass Yellow – adult (*Eurema hecabe*)

Lemon Migrant – adult (*Catopsilia pomona*)

Meadow Argus – larvae (*Junonia villida*)

Purple Moonbeam – adult (*Philiris innotatus*)

Regent Skipper – adult (*Euschemon rafflesia*)

Tailed Emperor – pupae (*Polyura sempronius*)

Wanderer – larvae and adults (*Danaus plexippus*)

White Migrant – adult (*Catopsilia pyranthe*)

Yellow Albatross – adult male (*Appias paulina*)



YOU ASKED



Q. I took this photo in Tanzania on 11th June 2013, in Tarangire National Park which is in savannah country, not far east of the Serengeti. We were “on safari” and butterflies flew up around the wheels of the troop carrier. Where did they come from? I looked ahead and saw it. Fresh elephant manure on the track with lots of white spots. I asked the driver to stop. Not having a fancy zoom lens on the camera, I checked for hungry

animals and jumped out. Here’s the photo. Can someone please tell me what butterflies are enjoying the freshly served mineral tablet? Thank you. Ray Archer

A. Mike Barnett, BOIC member who is a frequent visitor to Africa has identified the butterfly species as the African Common White (*Belenois creona*), a common species of the African savannah. Like their Australian cousins, the Caper White butterflies (*Belenois java*), the larvae feed on *Capparis* species.

B.O.I.C. ON FACEBOOK

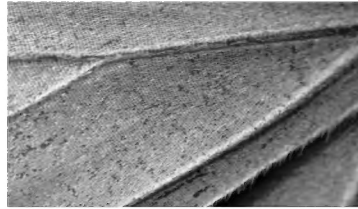
Join BOIC on Facebook! Some friends of BOIC were “lost” during changes to Facebook within the last year, so please check to see if you are still part of the BOIC Facebook group. If you are on Facebook you can join the BOIC page here - <https://www.facebook.com/groups/187619097411>

OTHER GROUPS’ ACTIVITIES

Butterflies in the heart of London - Alisha Steward

On a recent holiday to London in July 2013 my partner Jon and I visited a live butterfly display called “Sensational Butterflies” – in the grounds of the famous Natural History Museum! Many different species were represented, and included hundreds of adults, the odd larva, and many pupae. The display will run until the 15th of September this year and entry costs £4.50 per person. Check out their website for more detail <http://www.nhm.ac.uk/visit-us/whats-on/temporary-exhibitions/sensational-butterflies/index.htm>





1. Entrance to exhibit
2. Pupae and newly-emerged butterflies
3. Close-up of the scales of a *Morpho* wing

BUTTERFLY AND OTHER INVERTEBRATES CLUB PROGRAMME

An afternoon identifying Xyloryctidae followed by BBQ and Light Trap

What: The Xyloryctidae are a large group of moths with many similar looking species and many unnamed species. All interested persons are invited to bring along their specimens or photos and, as a group, see how many we can put names to. A light trap will be run in the evening for those who wish to stay. If you are staying bring something for a BBQ. Extras and afternoon tea will be provided.

When: **Saturday 26th October, 2013** starting at 1:00pm till late.

Where: Peter and Bev Hendry's home at Sheldon

RSVP: You must book a place. Directions will be provided. Please ring Peter or Bev on 3206 0048

Excursion to Kalbar – the Scenic Rim (rescheduled from last year)

When: Saturday 2nd – Sunday 3rd November 2013 (day trips are possible from Brisbane, approx. 1 hour drive)

What: Aubrey Podlich, club member and local naturalist from Boonah, has invited members to visit his 43 acre "softwood vine scrub" near Kalbar on the weekend 2/3 November. Some of the local Fassifern Field Nats may guide us around. Activities will include identification of butterfly and moth hostplants as well as recording insects to add to his list of ~45 butterflies. It is likely that UV lights will be set up in the evening to attract beetles, cicadas, moths and other insects. It may be possible for the die-hards to camp overnight on site to monitor the light trap.

Where, RSVP: Details, including directions, meeting time and place will be available on registering with John Moss on (07) 3245 2997 (or johntimmoos@gmail.com).

Bring: All meals, water, hat, sunscreen, suitable footwear. Bring first aid kit, including snake bandages, if possible. If camping overnight, bring all gear required – tent, sleeping bag, gas stove for cooking, food, etc. Note bush camping = no toilet facilities.

NOTE: In the event of heavy rain leading up to this trip please contact John Moss, as accessibility to the property can be a problem.

Committee/Planning Meeting – 9th November, 2013



DISCLAIMER

The magazine seeks to be as scientifically accurate as possible but the views, opinions and observations expressed are those of the authors. The magazine is a platform for people, both amateur and professional, to express their views and observations about invertebrates. These are not necessarily those of the BOIC. The manuscripts are submitted for comment to entomologists or people working in the area of the topic being discussed. If inaccuracies have inadvertently occurred and are brought to our attention we will seek to correct them in future editions. The Editor reserves the right to refuse to print any matter which is unsuitable, inappropriate or objectionable and to make nomenclature changes as appropriate.

ACKNOWLEDGMENTS

Producing this magazine is done with the efforts of:

- Those members who have sent in letters and articles
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- Daphne Bowden who works on layout, production and distribution
- John Moss, Dr. Kelyvn L. Dunn, Dr Murray J. Fletcher and Dr Michael Braby for scientific referencing and proof reading of various articles in this issue of the magazine
- Printing of this publication is proudly supported by Brisbane City Council



Dedicated to a better Brisbane

We would like to thank all these people for their contribution.

ARE YOU A MEMBER?

Please check your mailing label for the date your membership is due for renewal. If your membership is due, please renew as soon as possible. **Membership fees are \$30.00 for individuals, schools and organizations.** If you wish to pay electronically, the following information will assist you: BSB: **484-799**, Account No: **001227191**, Account name: **BOIC**, Bank: **Suncorp**, Reference: your membership number and surname e.g. **234 Roberts**.

Butterfly and Other Invertebrates Club Inc.
PO Box 2113
RUNCORN Q. 4113

Next event – An afternoon identifying Xyloryctidae followed by BBQ and Light Trap –
26th October – See Programme for details



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